ARMED FORCES EPIDEMIOLOGICAL BOARD
5109 LEESBURG PIKE
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August 11, 2006

Armed Forces Epidemiological Board

MEMORANDUM FOR The Honorable William Winkenwerder, Jr., MD, Assistant Secretary of Defense for Health Affairs

SUBJECT: Traumatic Brain Injury in Military Service Members – 2006-02

1. In keeping with the Armed Forces Epidemiology Board's (AFEB) mission providing independent scientific advice on matters concerning operational programs, policy development, and research needs for the prevention of disease and injury and promotion of health, the AFEB has reviewed evidence regarding the acute and long-term health implications of traumatic brain injury (TBI) in military service members and has developed recommendations on how DoD should approach TBI prevention, medical management, and future research.

2. Based on scientific literature including those documents identified in the Board's citations and other reports indicating that blast-related events compose a substantial number of combat injuries in the war on terrorism, and due to concerns regarding the long-term consequences of repeated concussion on military service members, the Board requested and received a series of briefings and a panel discussion on traumatic brain injury during a closed session at the March 6, 2006 AFEB meeting at Fort Detrick, MD.

3. Traumatic brain injury is a major public health concern and a cause of death and life-long disability in the United States, with an estimated 1.5 million Americans sustaining a TBI yearly (NCIPC, Report to Congress 2003). There is increasing evidence that clinically and pathophysiologically relevant neurologic injury occurs after even mild traumatic brain injury (MTBI) or concussion, and may have long term neurologic sequela (NCIPC, Report to Congress 2003, Bazarian 2006). Mild traumatic brain injury (MTBI) has been recognized by Congress as a public health issue in the past. In response to this concern, Congress passed the *Children's Health Act of 2000* to which the CDC responded by recommending appropriate methodological strategies to obtain data on the incidence and prevalence of MTBI (NCIPC, Report to Congress 2003).

4. Various agencies within the Department have taken commendable steps to address TBI. The Board is aware of recent activities by the Assistant Secretary of Defense for Health Affairs in this important area. The Board specifically commends the Army and the Marine Corps for recognizing TBI as a significant health and operational concern and for implementing changes in mission tactics, enhancements in traumatic care, and research into improvements in body armor. Many of these processes, however, are aimed at reducing the most severe forms and clinical consequences of TBI. There remains a need to better understand the unique characteristics of blast-associated TBI and to reduce the health risk and complications from mild or moderate forms of brain injury.

5. While the efforts of these various agencies are noteworthy, it appears to the Board that the DoD lacks a system-wide approach for proper identification, management, and surveillance for individuals who sustain a TBI, in particular mild TBI/concussion. It is timely for the DoD to be a leader in

tackling the issue of TBI, given our current wartime challenges. With a **primary goal** of delivering the highest standard of care to our military forces, a DOD-wide consensus of care, to include a standardized method of on-the-field concussion assessment, is necessary. In addition, a standardized follow-up utilizing appropriate clinical assessment techniques to recognize neurologic and behavioral effects of TBI following acute injury is important. Such advancement will enable the initiation and improvement of prevention strategies, patient management and surveillance, and basic and clinical research.

Recommendation:

6. The Board believes, based on its review, that DoD would benefit from a systematic policy-driven approach to the prevention, medical assessment, and management of traumatic brain injury in military service members. The main focus of the activities should concentrate on prevention activities in the combat theater, to include 1) improved personal protective equipment, 2) standard methods of acute injury on-the-field concussion/traumatic brain injury assessment, 3) effective disposition assessment regarding when and if a service member who has sustained a TBI event should return to duty, 4) efficient and effective documentation of acute injury and disposition assessment, and blast related events in theater to better inform senior leadership, improve the collection of TBI/blast related clinical information and help in the formulation of future research questions, 5) systematic follow-up assessment and medical management for service members suspected of having or with a known TBI event, and 6) education of service members and their families, unit commanders and fellow service members, and any individuals in a position to encounter and care for soldiers at risk for a TBI during or after military service.

7. While the primary focus should be on TBI prevention, assessment, and medical management in the combat theater, DoD should continue some form of post-deployment screening to help ensure that those who remain impaired or are suffering persistent TBI-related health problems are identified for follow-up care. This is recommended because mild to moderate TBI symptoms can be subtle with no apparent stigmata. However, TBI may markedly decrease performance, placing the injured service member, his/her fellow service members, and future missions in jeopardy. Ideally, when combat theater-level activities and documentation collection processes are fully in place, the Department may consider phasing out post-deployment screening. However, given the recognized difficulties in data collection and health care delivery in a combat environment, post-deployment screening would provide an additional safety net for those with persistent or previously unreported TBI symptoms. Consideration should be given to establishing a cohort of combat-theater service members for follow-up after deployment for incidence of health effects related to blast injury.

8. The Board wishes to stress that the primary focus of post-deployment screening is to help identify those requiring additional medical evaluation and subsequent therapy. There is a temptation to over-estimate the epidemiological value of information from screening instruments and to imply injury or illness rates from these data. The Department should guard against this temptation as well as inferring mild or moderate TBI clinical classification based solely on self-reported information.

9. Consideration should also be given to implementation of a baseline screening tool to enhance the utility of post-injury formal neuropsychological testing. Such a tool would be most effective if implemented upon entry into military service. At a minimum, implementing baseline testing should be considered pre-deployment and in military occupations at high risk for blast or impact injury.

10. The Board strongly recommends the Department consider forming a consensus panel comprised of front line and first level health care providers, and individuals with expert knowledge and specialty training in the care of TBI, (such as neurologists and neurosurgeons, physiatrists, psychiatrists, rehabilitation specialists, experts in the evaluation of evidence-based medicine and epidemiologists) to address the above recommendations. DoD should consider including Veterans Affairs representatives on the consensus panel to address access and availability of rehabilitation services in the DoD and VA systems for military personnel and veterans with mild to moderate to severe TBI.

11. The Board also recognizes that traumatic brain injury events also occur in other military environments, particularly some forms of training. The lessons learned in the combat theater would assist in the prevention and medical management of TBI in training exercises and other at risk environments.

12. The Board strongly advocates for additional TBI research, particularly as it relates to blast associated events. The majority of concussion related information and guidelines currently available are the result of research on impact events, particularly from sports related activities. There is considerable uncertainty as to how well these guidelines apply to blast related concussion. Further research is needed to fill current information gaps, help guide patient care, and potentially reduce long-term disability. In particular, the long term impact of repeated mild or moderate blast-related traumatic brain injuries over short periods of time requires further study.

Gregory A. Poland, M.D.
President

Wayne M. Lednar, M.D., Ph.D.
Chair, Occupational and
Environmental Health Subcommittee

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